

Appendix B: Pipe Material and Installation Costs

Final Costs for Entry into Tabula

Description	Unit	Tabula 9/05 cost based on Seattle ENR CCI Index	Success			
			Recommended Force Main & High Head Force Main Cost w/ 15% for misc test, cathodic protect, fittings, valves, BO, ARVS, etc	Recommended Gravity Sewer Cost w/ 2% for misc test, fitting, etc	Force Main Pipe Installation Only using KC Wage Rates	Recommended Pipe Installation Cost w/ 10% for test, fittings, etc
Escalation/Location Factors		1.176				
Clean, testing, fittings, valves, etc			1.15	1.02		1.1
Pipe Material & Install Cost						
8" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$13	\$18.00			
High Head Force Main - RJ CLDI	LF	\$18	\$24.00			
Gravity Sewer - Class V RCP	LF	\$12		\$8.00		
Installation Cost	LF	\$12			\$17.00	\$18.00
10" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$16	\$24.00			
High Head Force Main - RJ CLDI	LF	\$24	\$31.00			
Gravity Sewer - Class V RCP	LF	\$14		\$10.00		
Installation Cost	LF	\$14			\$18.00	\$20.00
12" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$21	\$30.00			
High Head Force Main - RJ CLDI	LF	\$29	\$38.00			
Gravity Sewer - Class V RCP	LF	\$18		\$16.00		
Installation Cost	LF	\$18			\$21.00	\$24.00
14" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$27	\$38.00			
High Head Force Main - RJ CLDI	LF	\$38	\$50.00			
Gravity Sewer - Class V RCP	LF					
Installation Cost	LF	\$21			\$21.00	\$24.00
15" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$21		\$17.00		
Installation Cost	LF	\$24				\$24.00
16" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$31	\$45.00			
High Head Force Main - RJ CLDI	LF	\$45	\$59.00			
Gravity Sewer - Class V RCP	LF					
Installation Cost	LF	\$26			\$29.00	\$26.00
18" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$35	\$52.00			
High Head Force Main - RJ CLDI	LF	\$52	\$68.00			
Gravity Sewer - Class V RCP	LF	\$27		\$22.00		
Installation Cost	LF	\$29			\$33.00	\$27.00
20" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$41	\$58.00			
High Head Force Main - RJ CLDI	LF	\$59	\$78.00			
Gravity Sewer - Class V RCP	LF					
Installation Cost	LF	\$31			\$37.00	\$29.00
21" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$31		\$24.00		
Installation Cost	LF	\$32				\$30.00
24" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$51	\$73.00			
High Head Force Main - RJ CLDI	LF	\$76	\$98.00			
Gravity Sewer - Class V RCP	LF	\$35		\$32.00		

Final Costs for Entry into Tabula

Description	Unit	Tabula 9/05 cost based on Seattle ENR CCI Index	Success			
			Recommended Force Main & High Head Force Main Cost w/ 15% for misc test, cathodic protect, fittings, valves, BO, ARVS, etc	Recommended Gravity Sewer Cost w/ 2% for misc test, fitting, etc	Force Main Pipe Installation Only using KC Wage Rates	Recommended Pipe Installation Cost w/ 10% for test, fittings, etc
Escalation/Location Factors Clean, testing, fittings, valves, etc		1.176	1.15	1.02		1.1
Installation Cost	LF	\$35			\$43.00	\$36.00
27" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$42		\$49.00		
Installation Cost	LF	\$41				\$51.00
30" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$94	\$105.00			
High Head Force Main - RJ CLDI	LF	\$129	\$139.00			
Gravity Sewer - Class V RCP	LF	\$59		\$60.00		
Installation Cost	LF	\$47				\$53.00
36" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$127	\$145.00			
High Head Force Main - RJ CLDI	LF	\$176	\$191.00			
Gravity Sewer - Class V RCP	LF	\$71		\$73.00		
Installation Cost	LF	\$63				\$65.00
42" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$165	\$196.00			
High Head Force Main - RJ CLDI	LF	\$217	\$250.00			
Gravity Sewer - Class V RCP	LF	\$92		\$95.00		
Installation Cost	LF	\$71				\$70.00
48" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$235	\$260.00			
High Head Force Main - RJ CLDI	LF	\$282	\$310.00			
Gravity Sewer - Class V RCP	LF	\$123		\$121.00		
Installation Cost	LF	\$85				\$79.00
54" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$294	\$340.00			
High Head Force Main - RJ CLDI	LF	\$370	\$410.00			
Gravity Sewer - Class V RCP	LF	\$176		\$151.00		
Installation Cost	LF	\$118				\$97.00
60" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$370	\$400.00			
High Head Force Main - RJ CLDI	LF	\$458	\$470.00			
Gravity Sewer - Class V RCP	LF	\$223		\$210.00		
Installation Cost	LF	\$141				\$105.00
72" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$282		\$270.00		
Installation Cost	LF	\$188				\$126.00
78" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$329		\$320.00		
Installation Cost	LF	\$212				\$140.00
84" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$423		\$380.00		

Final Costs for Entry into Tabula

Description	Unit	Tabula 9/05 cost based on Seattle ENR CCI Index	Success			
			Recommended Force Main & High Head Force Main Cost w/ 15% for misc test, cathodic protect, fittings, valves, BO, ARVS, etc	Recommended Gravity Sewer Cost w/ 2% for misc test, fitting, etc	Force Main Pipe Installation Only using KC Wage Rates	Recommended Pipe Installation Cost w/ 10% for test, fittings, etc
Escalation/Location Factors		1.176				
Clean, testing, fittings, valves, etc			1.15	1.02		1.1
Installation Cost	LF	\$235				\$158.00
96" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$517		\$490.00		
Installation Cost	LF	\$282				\$210.00
108" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$635		\$610.00		
Installation Cost	LF	\$329				\$315.00
120" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$846		\$740.00		
Installation Cost	LF	\$423				\$420.00
144" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$1,234		\$1,300.00		
Installation Cost	LF	\$564				\$505.00

Percentage of fittings, valves, connections, blow offs, ARV, Cathodic Protection, Test, etc	%
Port Angeles 16" DI FM	15%
Port Angeles 4" PVC FM	20%
Redmond 8" DI Gravity	13%
SE Lake Sammamish 20" PVC FM	11%
Average %	15%

Pipe Installation Comparisons

	RS Means	RS Means	RS Means								
Description	Force Main (CLDI) Daily Pipe Production (LF)	High Head Force Main (RJ CLDI) Daily Pipe Production (LF)	Gravity Sewer (RCP) Daily Pipe Production (LF)	Force Main (CLDI) Crew Description	Force Main (CLDI) Crew Rate (\$/HR)	Gravity Sewer (RCP) Crew Description	Gravity Sewer (RCP) Crew Rate (\$/HR)	Force Main (CLDI) Installation Cost	High Head Force Main (RJ CLDI) Installation Cost	Gravity Sewer (RCP) Installation Cost	Tabula in Current \$
Pipe Material & Install Cost											
8" Pipe	200	133	200	B21A	\$ 433.37	B14	\$407.52	\$17.33	\$26.07	\$16.30	\$11.76
10" Pipe	181	114	180	B21A	\$ 433.37	B14	\$407.52	\$19.15	\$30.41	\$18.11	\$14.11
12" Pipe	160	105	150	B21A	\$ 433.37	B14	\$407.52	\$21.67	\$33.02	\$21.73	\$17.63
14" Pipe	133	100		B21A	\$ 433.37			\$26.07	\$34.67		\$21.16
15" Pipe			150			B14	\$407.52			\$21.73	\$23.51
16" Pipe	114	73		B21A	\$ 433.37			\$30.41	\$47.49		\$25.86
18" Pipe	100	69	132	B21A	\$ 433.37	B14	\$407.52	\$34.67	\$50.25	\$24.70	\$29.39
20" Pipe	89	57		B21A	\$ 433.37			\$38.95	\$60.82		\$30.56
21" Pipe			120			B14	\$407.52			\$27.17	\$31.74
24" Pipe	77	47	100	B21A	\$ 433.37	B14	\$407.52	\$45.03	\$73.77	\$32.60	\$35.27
27" Pipe			92			B13	\$531.39			\$46.21	\$41.14
30" Pipe			88			B13	\$531.39			\$48.31	\$47.02
36" Pipe			72			B13	\$531.39			\$59.04	\$63.48
42" Pipe			72			B13B	\$573.39			\$63.71	\$70.53
48" Pipe			64			B13B	\$573.39			\$71.67	\$84.64
54" Pipe			52			B13B	\$573.39			\$88.21	\$117.56
60" Pipe			48			B13B	\$573.39			\$95.57	\$141.07
72" Pipe			40			B13B	\$573.39			\$114.68	\$188.09
78" Pipe			36			B13B	\$573.39			\$127.42	\$211.60
84" Pipe			32			B13B	\$573.39			\$143.35	\$235.11
96" Pipe			24			B13B	\$573.39			\$191.13	\$282.14
108" Pipe			16			B13B	\$573.39			\$286.70	\$329.16
120" Pipe			12			B13B	\$573.39			\$382.26	\$423.20
144" Pipe			10			B13B	\$573.39			\$458.71	\$564.27

RS Means production rates are in standard script.
Extrapolated production rates are shown in *Italics*.

Pipe Material Comparisons

Description	Unit	Tabula 9/05 cost based on Seattle ENR CCI Index	US Pipe Quote 9/15/05 w/ 10% markup for Frgt & OH&P	Hanson Pipe Quote 9/7/05 w/ 10% markup for Frgt & OH&P	RS Means Materials Cost Tyton DI & MJ Joint (Seattle WA Factor)	RS Means Materials Cost RCP CL 3 & 5 (Seattle WA Factor)
Escalation/Location Factors		1.176	1.1	1.1	0.984	0.984
Pipe Material & Install Cost						
8" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$13	\$15.94		\$13.99	
High Head Force Main - RJ CLDI	LF	\$18	\$20.71			
Gravity Sewer - Class V RCP	LF	\$12		\$7.70		
Installation Cost	LF	\$12				
10" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$16	\$20.87		\$21.55	
High Head Force Main - RJ CLDI	LF	\$24	\$26.80			
Gravity Sewer - Class V RCP	LF	\$14		\$9.35		
Installation Cost	LF	\$14				
12" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$21	\$26.18		\$22.81	
High Head Force Main - RJ CLDI	LF	\$29	\$33.26			
Gravity Sewer - Class V RCP	LF	\$18		\$15.95		\$14.26
Installation Cost	LF	\$18				
14" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$27	\$33.35		\$25.01	
High Head Force Main - RJ CLDI	LF	\$38	\$43.44			
Gravity Sewer - Class V RCP	LF					
Installation Cost	LF	\$21				
15" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$21		\$17.05		\$17.94
Installation Cost	LF	\$24				
16" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$31	\$38.90		\$35.10	
High Head Force Main - RJ CLDI	LF	\$45	\$51.43			
Gravity Sewer - Class V RCP	LF					
Installation Cost	LF	\$26				
18" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$35	\$44.87		\$38.73	
High Head Force Main - RJ CLDI	LF	\$52	\$59.17			
Gravity Sewer - Class V RCP	LF	\$27		\$21.45		\$18.75
Installation Cost	LF	\$29				
20" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$41	\$50.82		\$42.91	
High Head Force Main - RJ CLDI	LF	\$59	\$67.44			
Gravity Sewer - Class V RCP	LF					
Installation Cost	LF	\$31				
21" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$31		\$23.65		\$18.75
Installation Cost	LF	\$32				
24" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$51	\$63.47		\$55.56	

Pipe Material Comparisons

Description	Unit	Tabula 9/05 cost based on Seattle ENR CCI Index	US Pipe Quote 9/15/05 w/ 10% markup for Frgt & OH&P	Hanson Pipe Quote 9/7/05 w/ 10% markup for Frgt & OH&P	RS Means Materials Cost Tyton DI & MJ Joint (Seattle WA Factor)	RS Means Materials Cost RCP CL 3 & 5 (Seattle WA Factor)
Escalation/Location Factors		1.176	1.1	1.1	0.984	0.984
High Head Force Main - RJ CLDI	LF	\$76	\$85.47			
Gravity Sewer - Class V RCP	LF	\$35		\$31.35		\$27.85
Installation Cost	LF	\$35				
27" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$42		\$47.85		\$34.57
Installation Cost	LF	\$41				
30" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$94	\$91.38			
High Head Force Main - RJ CLDI	LF	\$129	\$120.70			
Gravity Sewer - Class V RCP	LF	\$59		\$58.85		\$37.11
Installation Cost	LF	\$47				
36" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$127	\$125.84			
High Head Force Main - RJ CLDI	LF	\$176	\$165.87			
Gravity Sewer - Class V RCP	LF	\$71		\$72.05		\$52.82
Installation Cost	LF	\$63				
42" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$165	\$170.17			
High Head Force Main - RJ CLDI	LF	\$217	\$214.45			
Gravity Sewer - Class V RCP	LF	\$92		\$92.95		\$70.67
Installation Cost	LF	\$71				
48" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$235	\$223.28			
High Head Force Main - RJ CLDI	LF	\$282	\$271.40			
Gravity Sewer - Class V RCP	LF	\$123		\$118.25		\$86.79
Installation Cost	LF	\$85				
54" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$294	\$297.96			
High Head Force Main - RJ CLDI	LF	\$370	\$359.28			
Gravity Sewer - Class V RCP	LF	\$176		\$147.95		
Installation Cost	LF	\$118				
60" Pipe						
Force Main - Tyton CI 53 CLDI	LF	\$370	\$343.90			
High Head Force Main - RJ CLDI	LF	\$458	\$410.73			
Gravity Sewer - Class V RCP	LF	\$223		\$206.25		\$137.29
Installation Cost	LF	\$141				
72" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$282		\$264.00		\$192.59
Installation Cost	LF	\$188				
78" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$329		\$316.80		
Installation Cost	LF	\$212				

Pipe Material Comparisons

Description	Unit	Tabula 9/05 cost based on Seattle ENR CCI Index	US Pipe Quote 9/15/05 w/ 10% markup for Frgt & OH&P	Hanson Pipe Quote 9/7/05 w/ 10% markup for Frgt & OH&P	RS Means Materials Cost Tyton DI & MJ Joint (Seattle WA Factor)	RS Means Materials Cost RCP CL 3 & 5 (Seattle WA Factor)
Escalation/Location Factors		1.176	1.1	1.1	0.984	0.984
84" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$423		\$369.60		\$322.59
Installation Cost	LF	\$235				
96" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$517		\$477.40		\$385.83
Installation Cost	LF	\$282				
108" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$635		\$601.70		
Installation Cost	LF	\$329				
120" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$846		\$726.00		
Installation Cost	LF	\$423				
144" Pipe						
Force Main - Tyton CI 53 CLDI	LF					
High Head Force Main - RJ CLDI	LF					
Gravity Sewer - Class V RCP	LF	\$1,234		\$1,275		
Installation Cost	LF	\$564				

Notes

- 1 Pipe cost includes excavation, bed & zone, backfill, testing, fittings, etc
- 2 Pipe cost includes excavation, import bed & zone, testing, fittings, etc but does not include imported trench backfill
- 3 Pipe cost includes excavation, native backfill, testing, fittings, etc but does not include imported bed & zone material
- 4 Pipe cost for install include excavation, pipe install & testing but do not include backfill
- 5 SPU Pipe DI cost are for CI 52 pipe including fittings. All pipe cost include both material & installation.